

Optical-constant metrology of VUV thin-film materials

L. Rodríguez-de Marcos

Instituto de Optica-Consejo Superior de Investigaciones Científicas (CSIC)

Optical constants of materials, when available, often lack consistency, which may be due to the use of data from different sources and/or to the use of inaccurate data. Consistency requires that n and k be connected with the Kramers-Krönig (KK) relations. GOLD has been obtaining self-consistent optical constants of several materials. Samples of the target material are measured in a wide range in order to minimize extrapolations in KK analysis. VUV transmittance and reflectance of thin films can be measured in GOLD's reflectometer, which enables in situ measurements of films before exposed to the atmosphere. The obtained n - k data set must fit all experimental data. When no data are available in some range, interpolations are performed with a physically meaningful model, such as Lorentz oscillators. The self-consistent n - k data so produced are tested with the use of two sum rules. We will display examples of optical constants obtained for materials among fluorides, oxides, and metals.